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## *Aloe succotrina* (Asphodelaceae)

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*Aloe succotrina*

## Asphodelaceae

## South Africa

*Aloe succotrina* Weston in *Botanicus universalis et hortulanus* 1: 5 (1770); Allioni: 65 (1773); Lamarck: 85 (1783); De Candolle: 85 (1801/2); Haworth: 19–20 (1804); Haworth: 75–76 (1812); Salm-Dyck: Sect. 22: t. 1 (1842); Baker: 173 (1880); Baker: 321 (1896); Marloth: 213–215 (1906); Berger: 282–284 (1908); Anon.: t. 400 (1914); Reynolds: 1–8, pls. I–IV (1948); Adamson: 171 (1950); Reynolds: 389–396 (1950); Jeppe: 50 (1969); Bornman & Hardy: 212–213 (1971); Wijnands: 126–127 (1983); Smith & Van Wyk: 57–58 (1996); Glen & Hardy: 105–106 (2000); Newton: 177 (2001); Smith & Van Wyk: 66 (2008); Guglielmone et al.: 179–180 (2009); Carter et al.: 379 (2011); Grace et al.: 148–149 (2011); Van Wyk & Smith: 102–103 (2014). *A. vera* Mill., non (L.) Burm.f.: No. 15 (1768). *A. perfoliata* var. *succotrina* Aiton: 466 (1789); Curtis: t. 472 (1800). *A. perfoliata* var. *purpurascens* Aiton: 466 (1789). *A. purpurascens* (Aiton) Haw.: 20 (1804); Haworth: 75 (1812); Salm-Dyck: Sect. 22: t. 2 (1842); Baker: 322 (1896); Berger: 284 (1908). *A. sinuata* Thunb.: 61 (1794); Thunberg: 311 (1823). *A. succotrina* var. *saxigena* A.Berger: 283 (1908).

*Aloe succotrina* has a very long and complex taxonomic and nomenclatural history with wrong synonymy that is rivalled by few other aloes. This is mostly due to early authors wrongly assuming that this plant is from the Island of Socotra (Reynolds 1950). It has been in cultivation in Europe for over three hundred years, so consequently it is rather surprising that this iconic fynbos species has not featured in this journal until now. Interestingly, the species is also not widely used in horticulture in Cape Town, its native habitat; there *Aloe ferox* and the natural hybrid between *Aloe ferox* and *Aloe arborescens*, both occurring much further afield, are far more commonly planted in public and private gardens and on road verges.

The earliest published figure of *Aloe succotrina* appears to be in Munting (1680: 20, fol. 21) as *Aloë vera minor*. As is typical of many of the images of plants published by the Dutch botanist Abraham Munting (1626–1683), the plant illustrated is shown growing in a rather ornate pot (reproduced in Reynolds 1950: 76, Fig. 49). Haworth (1804: 20) is the first author to link the Munting figure to *A. succotrina* and gives *A. vera minor* as a synonym of *A. succotrina* (note spelling). The image itself is highly stylised, but does show the main features of a sterile plant of *A. succotrina*.

The second published image of *Aloe succotrina* is from Plukenet (1691–1696: t. 240, Fig. 4) (Figure 1). Building up the confusion surrounding this species, Plukenet names this *Aloe americana ananifolia floribus suave-rubentibus*, implying an American origin. This too is similarly placed under the synonymy of *A. succotrina* by Haworth (1804: 20).

By far the most botanically and artistically significant early, highly accurate depiction of this species was published by Commelin (1697: 91–2, t. 48), (Figure 2). For this species Commelin used the polynomial *Aloe succotrina angustifolia spinosa, flore purpureo*, so here is the origin of the specific epithet as we know it today. Commelin

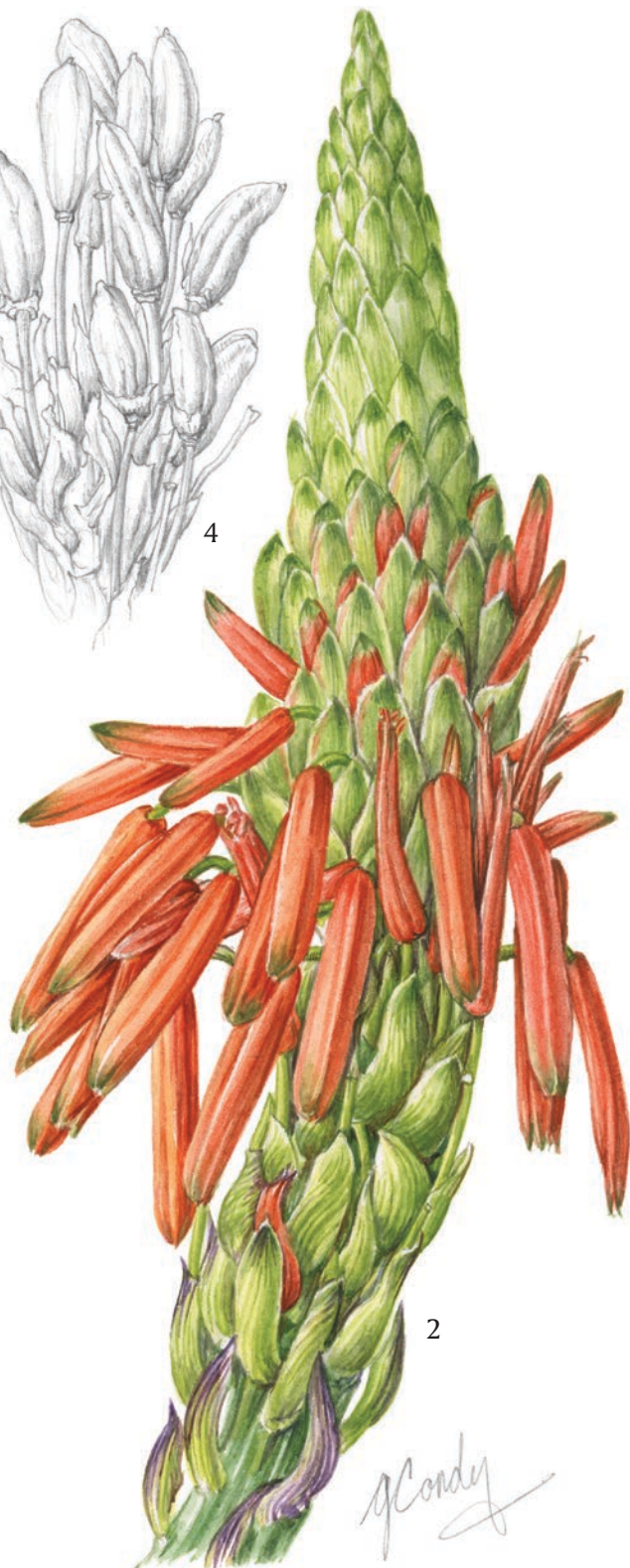
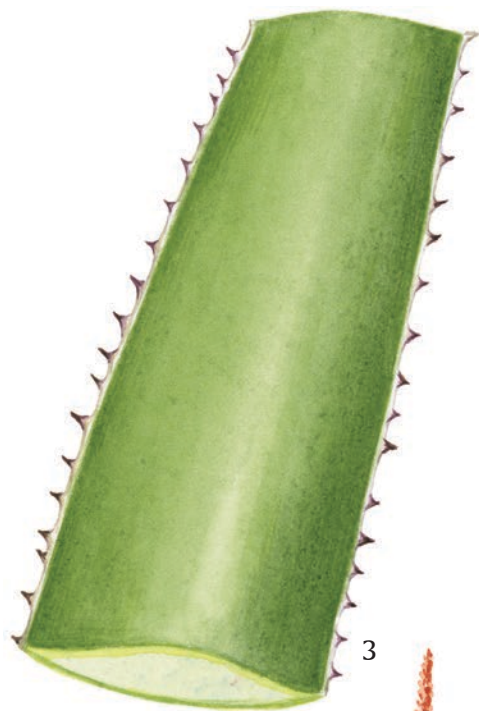


PLATE 2304 *Aloe succotrina*



obtained a small plant from Simon van Beaumont sometime before 1685. Van Beaumont (1640–1726) was secretary of the states of Holland and West-Friesland from 1673 and he owned a rich botanical collection in The Hague, of which a catalogue was published by Frans Kiggelaer in 1690 (Wijnands 1983). The plant flowered at the Hortus Medicus Amstelodamensis in Amsterdam in January–February 1689–1690 (Wijnands 1983), so this is the first record of it flowering in cultivation. There the plant was painted by the talented Dutch artist Jan Moninckx in 1689–1690, of which the original expertly executed watercolour painting is preserved in Amsterdam, whilst the engraved image appears as t. 48 in Commelin (1697). Commelin (translated into English in Reynolds 1950: 395) says that ‘when the leaves are cut through, they give a yellow bitter sap which is better and more pleasant to the smell than that of the usual and true *Aloe*, whose sap is unpleasant and stinks, but the smell of this one conforms with that of the true *Aloe succotrina*’. Notice significantly here that Commelin is distinguishing clearly between *A. succotrina* and what we now know as *A. vera*.

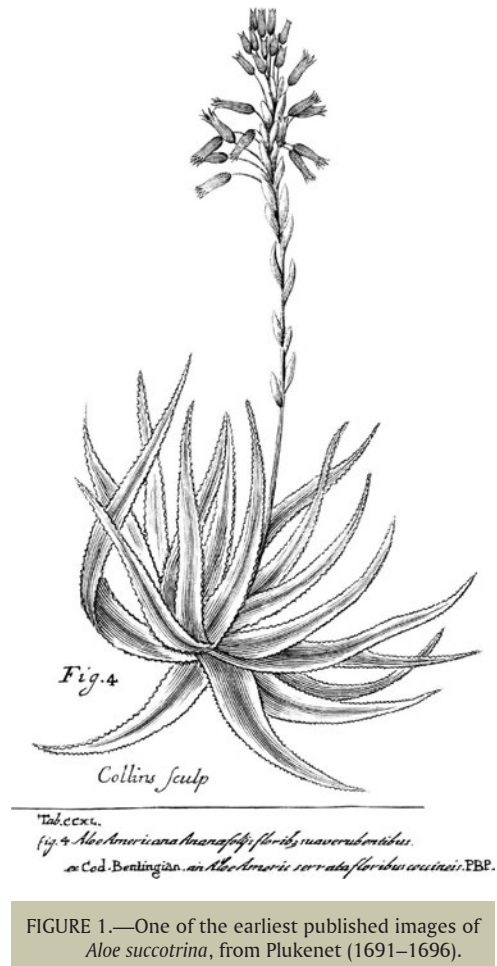


FIGURE 1.—One of the earliest published images of *Aloe succotrina*, from Plukenet (1691–1696).

To summarise our discussion of the early history of *Aloe succotrina*, we can conclude that this species was in cultivation in Europe as early as 1680, possibly even earlier. It is therefore surprising that *A. succotrina* was not among the aloes grown at the Dutch East India Company's (DEIC) garden in Cape Town when Heinrich Bernhard Oldenland was superintendent there in 1695 (Reynolds 1950; Karsten 1951), bearing in mind that the DEIC established a victualing station at the southern tip of Africa in 1652, some 40 years earlier.

*Aloe vera* Mill. (Miller 1768) is the first name for our plant at the species level. This is not *A. vera* (L.) Burm.f. for what is now the more familiar species and the basis of the multibillion dollar cosmetics and toiletries industry; the Burman name antedates Miller by a few weeks (Wijnands 1983). Miller (1768) wrote that this ‘... is the true Succotrine *Aloe*, from whence the best sort of *Aloe* for use in medicine is produced. This hath long, narrow, succulent leaves, which come out without



any order, and form large heads. The stalks grow three or four feet high, and have two, three, and sometimes four of these heads, branching out from it: the lower leaves spread out on every side, but the upper leaves turn inward toward the center; the flowers grow in long spikes, upon stalks about two feet high, each standing on a pretty long foot-stalk; they are of a bright red colour tipped with green: these generally appear in the winter season. This sort may be preserved through the winter in a warm green-house, but the plants so managed will not flower so frequently, as those which have a moderate degree of warmth in winter.' However, the earliest record of *A. succotrina* in cultivation at the Chelsea Physic Garden is Miller (1731), where the same *Aloe* appears in the first folio edition of his famous *Gardeners Dictionary* (Le Rougetel 1990). Clearly Miller had been very successful in cultivating this species at Chelsea, and presumably its introduction there was even earlier than 1731.

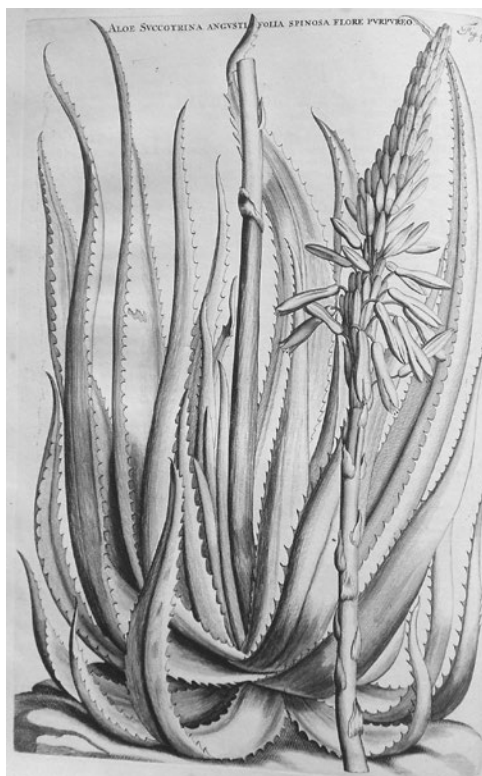


FIGURE 2.—*Aloe succotrina angustifolia spinosa flore purpureo* (= lectotype of *Aloe succotrina* Weston) from Commelin (1697).

The living material at Chelsea was later used by Blackwell (1737–39) for her herbal (more anon) and even later by Curtis (1800) who included a hand-coloured plate in his famous *Botanical Magazine*. He said that 'the figure here given was drawn in January 1799, from a plant in full bloom in the dry stove of the Apothecaries Garden at Chelsea; Mr. Fairburn informs me that it flowers regularly every year: the plant itself, supposed to be fifty years old.' Curtis went on to say that 'this undoubtedly is the *Aloë vera* of Miller, and the *perfoliata* var. *succotrina* of Mr. Aiton, that which produces the Succotrine Aloes of the shops, and is said to grow in the Island of Zocotra or Socotora, in the Straits of Babelmandel; it is therefore highly interesting as a medicinal plant, and very desirable as an ornamental one.' Here, then, we suggest, is a major source of the confusion regarding *Aloe succotrina* and its apparent, but incorrect, origin from the Island of Socotra.

Adrian Hardy Haworth (1768–1833) was the leading English authority on succulent plants during the first part of the nineteenth century (Stearn 1965). He first surveyed the genus *Aloe* in 1804 where amongst the species in his *Grandiflorae*, namely those species that we consider to be 'true' aloes today, he included both *Aloe succotrina* and *A. purpurascens*, the latter being newly described and accepted

at species level. For the former he observed that ‘by age [it] becomes dichotomous, but has no radical offsets like all the species of this section which precede it’ and for the latter he said that ‘like the last, when aged, it has a dichotomous stem, and no radical offsets’. He therefore made no attempt to distinguish between these two species. Indeed, these species are indistinguishable and were treated as being synonymous by Reynolds (1950). The specific epithet *purpurascens*, however, appropriately describes a diagnostic feature of *A. succotrina*, in that the dry leaves turn a very distinctive purple colour making this a useful character by which to identify mature plants, especially when they are not in flower (Van Wyk & Smith 2014).

The confusion regarding the true natural habitat of *Aloe succotrina* was solved by Marloth (1906). He reported that ‘... it grows in profusion a few miles outside of Cape Town. So far one spot only is known to me, which, however, is well hidden. It is situated about 1,200 feet above Newlands, on an immense field of boulders which must have been formed by the falling of an enormous cliff from the mountain above. There are hundreds, nay thousands, of boulders of all sizes, some as big as a house, with abysses between them that seem to lead into the interior of the earth. Where the spaces between the boulders have become filled with debris and leaf-mould, trees have succeeded in establishing themselves and are at present overshadowing some large groups of aloes. These are doomed, for the trees must win in this struggle for existence. But where the boulders are freely exposed to air and light, where the aloes have been able to find a little soil in a crack or on a ledge, they have taken full possession of the place. That no botanist or collector of the last century should have come across the plant is evidently due to the difficulty of access to the locality, for it is out of the track of the ordinary rambler. Only mountaineers who want to try the Window Gorge would pass it.’ So, the mystery was solved and a natural habitat for *A. succotrina* recorded for the very first time, well over 200 years after its first record of cultivation in Europe. This population described by Marloth is probably the one illustrated in a photo (Anon. 1914) and encountered on the Silvertree Trail (just below Window Gorge) in the Kirstenbosch National Botanical Garden. These plants grow in a huge boulder field with their dichotomous stems creeping over the rocks (Figure 3).

As we have seen, the modern name and spelling of *Aloe succotrina* had its origin in the polynomial used by Commelin (1697). Generally, however, the author of the binomial has been given as Lamarck (1783) or Allioni (1773). However, as shown by Guglielmone et al. (2009), the first valid publication of the specific epithet *succotrina* was by Weston (1770). They followed Wijnands (1983) who had designated the figure in Commelin (1697: t. 48) as lectotype, but also designated an epitype.

In terms of derivation of the epithet *succotrina*, the name refers to either the plant being thought to be the source of the drug socotrine aloes and originating from Socotra (yet it grows wild only in the extreme southwestern part of the Western Cape, South Africa), or to the compound word meaning ‘succus’ (sap) and ‘citrinus’ (lemon-yellow). Although the purple juice is characteristic of the plant, it was reported that it turns yellow when it dries (Grace et al. 2011), however, the fresh juice is in fact yellow and it turns purple when dry.



FIGURE 3.—*Aloe succotrina* in habitat in the boulder field on Table Mountain above Kirstenbosch National Botanical Garden, photographed in July 2010. Photograph: A.W. Klopper.

*Aloe succotrina* has a long history in herbals and books dealing with the medicinal use of plants. Here only selected exemplars will be given to indicate the confusion as to which species of *Aloe* have been used commercially as the source of material used in the manufacture of aloe products. An early example comes from Elizabeth Blackwell's herbal of 1737–39. Blackwell's *Curious Herbal* came about because Elizabeth needed income as her husband was in a debtor's prison. Elizabeth took lodgings in Chelsea, London, so she had ready access to the exotic plants being cultivated at the Chelsea Physic Garden, where her work was supported by Philip Miller and Sir Hans Sloane (Le Rougetel 1990; Madge 2001). She painted and engraved all 500 plates for the herbal that included two aloes now known as *A. vera* and *A. succotrina*. Her text accompanying the plate of *A. succotrina* is as follows: 'The stalks grow about three foot high, the leaves are a blue green and the flowers a light red. It is a native of the East Indies and flowers here [London] in December. The best Aloes of this species comes over in skins from the Island Succotora. Aloes is a great Ingredient in most of the officinal pills, being accounted a good Stomatic and useful to carry off tough & slimy Humors from the Bowels. Outwardly it is used for fresh wounds a little of the fine powder being put in them.' Notice already at this early date the confusion between the South African species and its apparent origin from the Island of Socotra. Figure 4 is from the later German edition (Blackwell 1747–1773).

Over a century later Bentley & Trimen (1875–1880), in their *Medicinal Plants*, correctly figured and described the South African species, but questioned its origin



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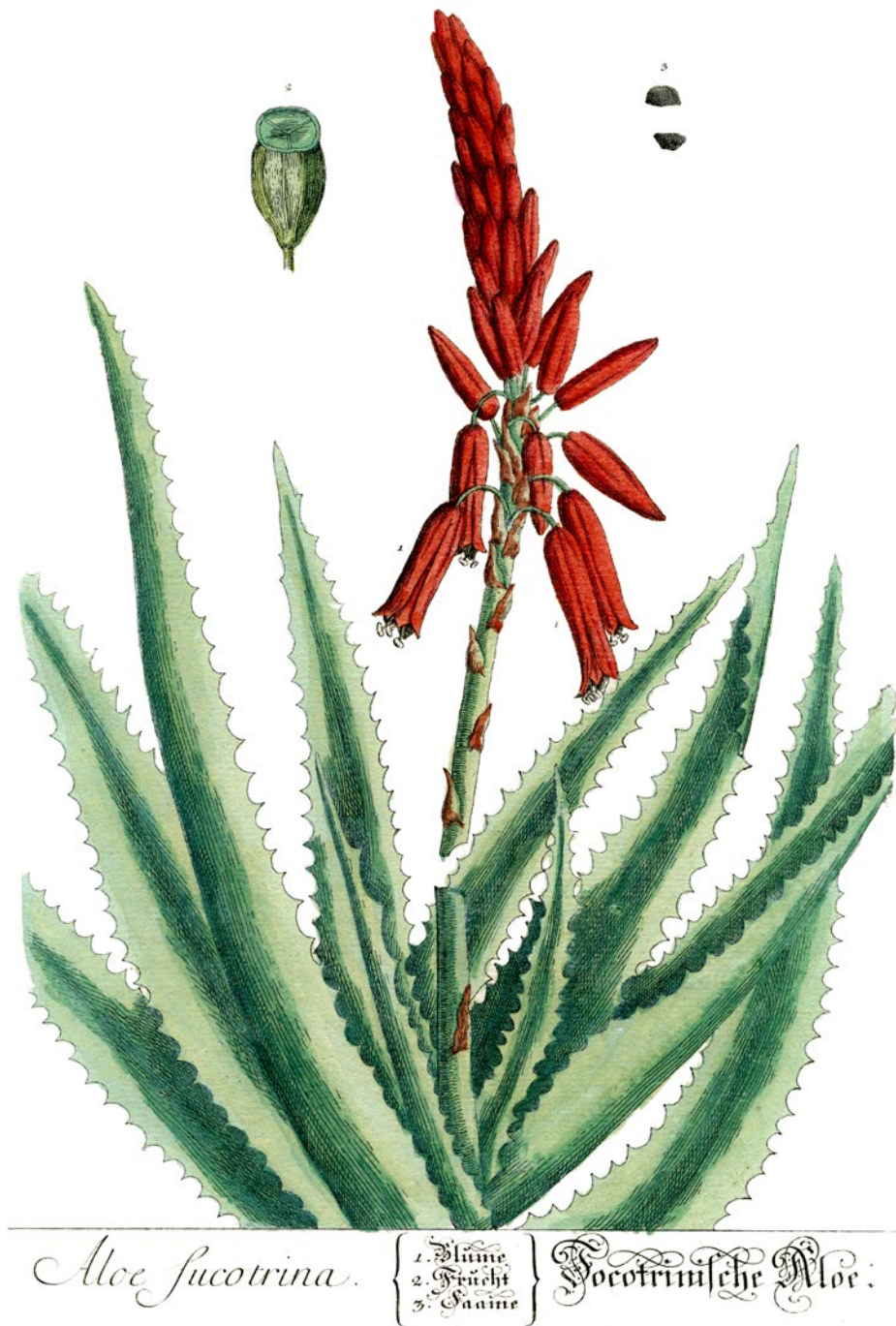


FIGURE 4.—*Aloe succotrina* from the German edition of Elizabeth Blackwell's *Curious Herbal* (Blackwell 1747–1773).



FIGURE 5.—*Aloe succotrina* growing on the Cape Peninsula were regarded as being distinct from plants from Hermanus, Kleinmond and other mainland localities. Photograph: A.W. Klopper.

from Socotra, namely: ‘... nor indeed do we know where the species has ever been collected in a wild state in Socotra or elsewhere. The aloe which is so abundant in Socotra has been seen by many travellers ... Whether this abundant plant is *A. succotrina* further examination must determine. That it is the present species may well be doubted, since an aloe undoubtedly gathered in Socotra by Mr. Wykeham Perry in 1878 (the only species he saw there) and sent in a living state to Kew ... was, as Mr. Baker informs us, a totally different species with short leaves.’ The Wykeham Perry species was named by Baker as *Aloe perryi* (Baker 1880).

Watt & Breyer-Brandwijk (1962), in their exhaustive survey of medicinal plants of southern and eastern Africa, include no mention of *Aloe succotrina*, whereas in contrast they state that ‘*Aloe ferox* Mill. seems to be the most important source of Cape aloes’. We can therefore conclude that there is a long history of confusion between the South African species *A. succotrina* (as clarified by Marloth, 1906) and the Socotran species, and possibly even with *A. ferox* and its products. Indeed *A. perryi* is the principal source of Socotran aloes that was a major export commodity from Socotra in ancient times and it continues to be harvested today (Miller &



Morris 2004). There is no evidence to support the conjecture that *A. succotrina* has ever been used commercially for the production of aloe products in South Africa.

*Aloe succotrina* is the type species of *Aloe* Section *Purpurascentes* Salm-Dyck. This section currently comprises six species, namely *A. framesii* L.Bolus, *A. gariepensis* Pillans, *A. khamiesensis* Pillans, *A. knersvlakensis* S.J.Marais, *A. microstigma* Salm-Dyck and *A. succotrina* Weston (Carter et al. 2011; Grace et al. 2011). Other authors recognise fewer species, some with infraspecific taxa (e.g. Glen & Hardy 2000). Members of this section all occur in western and other parts of southern South Africa, with two of the currently recognised species entering Namibia in the south (Reynolds 1950). The placement of *A. succotrina* in Section *Purpurascentes* has been questioned though (Kemble 2011). It is argued that *A. succotrina* might have closer affinities with *A. arborescens* from *Aloe* Section *Arborescentes* Salm-Dyck than it has to other members of the Section *Purpurascentes*. Reasons for this include a strong resemblance to *A. arborescens* in terms of the size and shape of the floral bracts, the overall appearance of the racemes, the white marginal teeth on the leaves and the appearance of the seed (S.J. Marais, pers. comm.).

*Aloe succotrina* is a somewhat variable species. Solitary plants with short, simple or branched, erect stems occur, or where conditions are favourable, large dense groups are found. The largest forms have stems of 1–2 m long that are dichotomously branched and form a large, rather unwieldy, canopy of many rosettes (Reynolds 1950). Historically, the disjunct distributions, which also exhibit very slight morphological differences, were considered to be separate species: plants growing on the Cape Peninsula (Figure 5) were regarded as being *A. succotrina*, while plants from Hermanus, Kleinmond (Figure 6) and other mainland localities were treated as *A. purpurascens* (Aiton) Haw. (Haworth 1804). As already mentioned, Reynolds (1950) concluded that these are merely geographical growth forms and do not warrant distinction at either specific or varietal level. We agree with this view. Diagnostic characters of *A. succotrina* are the erect, dull grey-green leaves with white marginal teeth, leaves and leaf exudate drying purple; inflorescence up to 1 m long, mostly unbranched, with fairly large purplish floral bracts and red flowers of  $\pm 40$  mm long.



FIGURE 6.—*Aloe succotrina* growing on the coast at Kleinmond, a popular coastal resort. This form was previously treated as a separate species, *A. purpurascens*. Photograph: A.W. Klopper.

*Aloe succotrina* is restricted to mountain slopes from the Cape Peninsula to Hermanus, Western Cape, South Africa. There is a disjunction between the populations on the Cape Peninsula and those at the Steenbras River mouth, Kleinmond and Hermanus (Figure 7). It is confined to Sandstone Fynbos (Peninsula Sandstone Fynbos and Kogelberg Sandstone Fynbos) (Mucina & Rutherford 2006), and grows on steep cliffs and rocky slopes, generally close to the sea and at elevations of up to 600 m above sea level. The area receives high winter rainfall (400–2 000 mm per annum). Flowering time is July–August (southern hemisphere).

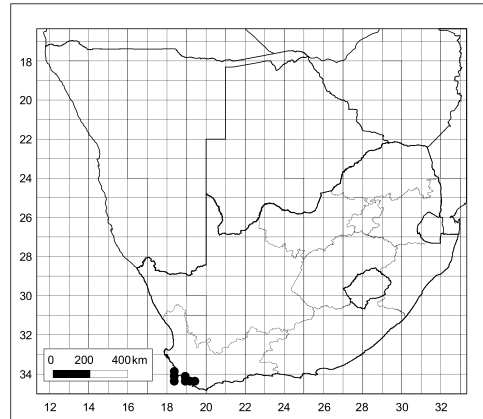


FIGURE 7.—Known distribution of *Aloe succotrina* in South Africa.

On the Cape Peninsula and Hottentots Holland Mountains most populations are confined to sheer cliffs. The featured plant (*E.J. van Jaarsveld* 22442, NBG) was gathered at De Boer, just south of Judas Peak, in the Cape of Good Hope Section of the Table Mountain National Park, on a sheer east-facing sandstone cliff (Peninsula Sandstone Fynbos). The shrubby plants have stems that droop, but carry the heads in a horizontal or ascending position. Here *Aloe succotrina* is locally abundant and grows together with other succulent plants, such as the endemic *Ruschia promontorii* and *Drosanthemum stokoei*. Other associated species include *Crassula nudicaulis*, *C. lanceolata*, *C. coccinea*, *C. saxifraga*, *Ruschia macowaniana*, *Curio serpens*, *Tylecodon paniculatus* and *Kedrostis nana*. Some plants were infected with the aloe ring fungus (*Uromyces aloes*). Plants grow in acidic soil that is low in mineral content.

Conservation status: although *Aloe succotrina* is listed as Least Concern in the Red List of South African Plants (Raimondo et al. 2009), it is rare with only relict populations consisting of relatively small groups. Possibly the largest populations are found on the north-facing cliffs at Karbonkelberg. Elsewhere populations are small and isolated. The coastal population at Kleinmond has recently been largely destroyed by municipal activities during enlargement of the harbour. Plants at Hermanus show signs of hybridisation, which threatens the genetic integrity of this population.

*Aloe succotrina* is pollinated by local sunbirds (double-collared and orange-breasted sunbirds) when it flowers during late autumn and winter. Seeds ripen during spring to early summer and are dispersed by wind (local thermals). Germination takes place within three weeks and plants will reach flowering size in about three to five years.

If grown outdoors in a region with a Mediterranean climate, *Aloe succotrina* is easy to cultivate and requires no special conditions, but must be kept frost-free in





FIGURE 8.—Seedlings of *Aloe succotrina* about four and a half years old growing in cultivation in England. Pot sizes range from 70 to 240 mm. Photograph: C.C. Walker.

the winter. A batch of seedlings (Figure 8) was raised in England by Tina Wardhaugh and subsequently grown on by one of us (CCW). The differences in growth rates of the seven seedlings four and a half years after germination are quite remarkable. These seedlings have yet to flower in cultivation in England. One of us (GFS) successfully grew the species in the mild-climate Eastern Cape of South Africa where plants do well in the open. However, above South Africa's climatically severe inland escarpment, plants benefit from protection from frost and too much summer rainfall.

*Aloe succotrina* has the common names of Table Mountain aloe (English), and *berg-aalwyn* and *Tafelbergaalwyn* (Afrikaans).

**Description.**—Caulescent or sometimes acaulescent plants, solitary or forming dense groups. *Stem* short or up to 2 m long, 100–150 mm diameter, simple or dichotomously branched, erect or procumbent, with persistent dried leaves; rosettes solitary or usually in dense large groups. *Leaves* densely rosulate, arcuate-erect, dull green to grey-green, drying purple, obscurely lineate, sometimes with few white spots, especially when young, lanceolate-attenuate, 250–500 mm long, 70–100 mm wide at base; margin narrow, dull white, cartilaginous, with firm, deltoid, white teeth, 2–4 mm long, up to 10 mm apart; exudate honey-coloured, drying purple. *Inflorescence* 0.75–1.00 m high, arcuate-erect, cone-shaped, mostly simple, rarely 1-branched. *Peduncle* with many sterile bracts, ovate-acute, up to 20–25 mm long, 15 mm wide, thin, rather scarious, many-nerved. *Raceme* cylindric-acuminate, 250–350 mm long, erect, subdense; buds erect to spreading, flowers nodding to pendent when open, buds partly obscured by large imbricate bracts. *Floral bracts* lanceolate, up to 20 mm long, 10 mm wide, turning purplish, thin, scarious, many-nerved. *Pedicels* 20–30 mm long. *Flowers*: *perianth* glossy red to reddish salmon, green tipped, 25–40 mm long, not narrowed above ovary, cylindric-trigonous; *outer segments* free to base, tips slightly spreading; *stamens* with pale lemon, filiform flattened filaments, exserted 3–5 mm; *ovary* 7–8 mm long, 2–3 mm diameter, green; *style* exserted to 5 mm. *Fruit* a capsule. *Chromosome number*:  $2n = 14$ . Plate 2304.

#### ACKNOWLEDGEMENTS

We are indebted to and hence gratefully thank several people who have helped prepare material for this publication. Roy Mottram scanned and digitally improved the Plukenet image. Tina Wardhaugh did the same for the plate from the Blackwell herbal and also raised the batch of seedlings shown in Figure 8. Gordon Rowley generously gave one of us (CCW) access to his remarkable library that includes a copy of the 1697 Commelin book. Dr Ernst van Jaarsveld kindly provided fresh material and additional information for the accompanying plate, and accompanied or directed one of us (RRK) to several natural populations of *Aloe succotrina*. Two anonymous referees are thanked for useful comments on, and suggested expansion to, the original manuscript.

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